REMARKS

Request for Reconsideration of Finality

The Office Action of August 9, 2006 was indicated as being final. However, the Office Action introduced new grounds for rejection by citing Okamoto et al. (U.S. Patent No. 6,385,239). These new grounds for rejection were not necessitated by Applicant's amendment since Applicant's last two responses did not include amendments. As such, Applicants should be given a fair opportunity to address this new reference and respectfully request that the finality of the last office action be withdrawn.

Claims 1 and 2

With the present amendment, claim 1 has been amended to include the limitations of claim 11. Since claim 11 was searched and examined, this amendment will not require any further searching on the part of the Examiner. As such, Applicants respectfully request entry of the amendment.

Under claim 1 an equalization target is identified for each of a set of heads. For each head, the equalization target is identified by measuring a goodness metric for first and second candidate targets by reading data through a channel. The measures of goodness metric are compared to each other and the candidate target with the better measure is selected. The selected target is then modified to improve the measure of the goodness metric. The number of times each equalization target was identified is then counted and the equalization target that was identified for the most heads is selected as the equalization target for the channel.

Former claim 11, which is now embodied in claim 1, was rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto et al. (U.S. Patent No. 6,385,239, hereinafter Okamoto in view of Sridharan et al.("A 110 MHz 350 mW 0.6μ CMOS 16-State

Generalized-Target Viterbi Detector for Disk Drive Read Channels", hereinafter Sridharan).

The combination of Okamoto and Sridharan does not show or suggest the invention of claim 1. In particular, neither of the references count the number of times an equalization target was identified for a head and then select the equalization target that was identified for the most heads.

In the Office Action, page 367, column 1 of Sridharan was cited to support this rejection. However, the cited section does not mention counting the number of times equalization targets were identified. Instead, the cited section discusses determining equalization target values for each head, where a target value is the read signal that is generated by the head given a target. Thus, each head has the same target, however, due to fluctuations in the performance of the head, the read signals will differ from head to head. Thus, the cited section does not involve determining equalization targets for a head but instead involve determining expected read signal values given a target. Further, the cited section makes no mention of counting the number of times a target is identified or selecting a target that is identified for the most heads. As such, claims 1 and 2 are patentable over Okamoto and Sridharan.

Claim 3

Claim 3 was rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto in view of McEwen et al. (U.S. Patent Number 6,732,328, hereinafter McEwen).

Claim 3 depends from claim 1 and as such includes the limitation in claim 1 to counting the number of times each equalization target is identified and selecting the equalization target that was identified for the most heads. None of Okamoto, Sridharan or McEwen show either of these limitations. As such,

claim 3 is patentable over the combination of Okamoto, Sridharan and McEwen.

Claims 5 and 7

Claims 5 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto in view of Sawaguchi et al. (U.S. Patent Number 5,539,588, hereinafter Sawaguchi).

Claims 5 and 7 are patentable over the combination of Okamoto, Sridharan and Sawaguchi because none of these references show or suggest counting the number of times each equalization target was identified or selecting an equalization target that was identified for the most heads as the equalization target for the channel.

In addition, claim 7 is further patentable over Okamoto, Sridharan and Sawaguchi. Under claim 7, the candidate target, which is constrained to have a spectral null, is modified so that it no longer has the spectral null. None of Okamoto, Sridharan or Sawaguchi show this limitation.

In the Office Action, it was asserted that Sawaguchi shows this limitation at column 3, lines 34-52. However, the cited section makes no mention of modifying an equalization target and specifically does not show modifying an equalization target that has a spectral null to form an equalization target that does not have the spectral null. As such, claim 7 is further patentable over the cited art.

Claims 8-10

Claims 8-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto in view of Sawaguchi and further in view of Sugawara et al. (U.S. Patent Number 6,501,610, hereinafter Sugawara).

Claims 8-10 are patentable over the combination of Okamoto, Sridharan, Sawaguchi and Sugawara because none of these references show or suggest counting the number of times each equalization target was identified or selecting an equalization target that was identified for the most heads as the equalization target for the channel.

Claims 8, 9 and 10 are also further patentable over the cited references. Under claim 8, the equalization target is modified by sequentially adjusting single terms in the target. Under claim 9, the equalization target is modified by increasing all of the terms in the target at the same time. Under claim 10, the equalization target is modified by sequentially changing pairs of terms. The combination of Okamoto, Sridharan, Sawaguchi and Sugawara does not show or suggest any of these techniques for modifying the equalization target.

In the Office Action, column 9, lines 10-25 of Sugawara were cited as showing these modifications to the equalization target. However, the cited section does not show any of these techniques for modifying an equalization target. Instead, the cited section discusses the adaptation of a filter to meet the requirements set by an equalization target. Although the cited section discusses changing filter coefficients, it does not show or suggest that an equalization target can or should be changed by sequentially changing single terms, or by changing all terms at the same time, or by sequentially changing pairs of terms. As such, the combination of Okamoto, Sridharan, Sawaguchi and Sugawara does not show or suggest the invention of claims 8, 9 and 10.

Claims 15, 16 and 18

Claims 15, 16 and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto in view of Cideciyan et al. (U.S. Patent Number 6,377,635, hereinafter Cideciyan).

Under claim 15, an equalization target is formed by searching through a plurality of candidate equalization targets that satisfy a spectral null constraint to locate an initial equalization target that provides a best goodness measure. The initial equalization target is then adjusted so that it no longer satisfies the spectral null constraint.

The combination of Okamoto and Cideciyan does not show or suggest the invention of claim 15. In particular, the combination does not show adjusting an initial equalization target that satisfies a spectral null constraint so that it no longer satisfies the spectral null.

In the Office Action, it was asserted that column 3, lines 23-43 of Cideciyan show this adjustment step. However, the cited section does not mention adjusting an equalization target. Instead, it discusses opitimizing a Viterbi detector given "an arbitrary generalized partial-response target." It does not mention adjusting an initial equalization target that satisfies a spectral null constraint so that it no longer satisfies the spectral null constraint. It simply discusses how to efficiently calculate a branch metric given an equalization target. There is simply no statement in Cideciyan that it is adjusting a target so that it does not satisfy a spectral null constraint.

Since neither Okamoto nor Cideciyan adjust a target that satisfies a spectral null constraint so that it does not satisfy the spectral null constraint, the combination of these references does not show or suggest the invention of claims 15, 16 or 18.

Claim 17

Claim 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto in view of Cideciyan and Sugawara.

Claim 17 depends from claim 15 and as such includes the limitation to adjusting an equalization target that satisfies a spectral null constraint so that it no longer satisfies the spectral null constraint. As noted above, neither Okamoto nor Cideciyan show this limitation. Sugawara also fails to show this limitation. As such, claim 17 is patentable over the combination of Okamoto, Cideciyan and Sugawara.

In addition, the combination of Okamoto, Cideciyan and Sugawara does not show or suggest adjusting an equalization target by sequentially adjusting a set of terms in the initial equalization target as found in claim 17.

In the Office Action, this limitation was said to be shown in Sugawara at col. 10, lines 51-67 and col. 11, lines 1-10. (Applicants note that Okamoto is listed in place of Sugawara in the Office Action, but it is clear that the Examiner intended to cite Sugawara). However, the cited section of Sugawara does not discuss adjusting an equalization target. Instead, the cited section discusses the adaptation of a filter to meet the requirements set by an equalization target. Although the cited section discusses changing filter coefficients, it does not show or suggest that an equalization target can or should be changed by sequentially changing single terms. As such, claim 17 is additionally patentable over the combination of Okamoto, Cideciyan and Sugawara.

Claims 20 and 21

Claims 20 and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto and Cideciyan as applied to claim 15 above and further in view of Sridharan.

Under claims 20 and 21, a separate equalization target is formed for each head or each head/zone pair. A count of the number of times each equalization target is formed is made. The target that is formed for the most heads or head/zone pairs is selected as the equalization target for the channel.

The combination of cited references does not show or suggest the invention of claims 20 and 21. In particular, none of the references show a step of counting the number of times each equalization target is formed. As such, claims 20 and 21 are patentable over the cited combination.

Claims 22 and 25

Claims 22 and 25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Okamoto in view of Cideciyan.

Claim 22 provides a method for selecting an equalization target. Under the method, a spectral null constraint is selected. An initial equalization target is then selected from a plurality of targets that satisfy the spectral null constraint. The initial equalization target is then adjusted so that it no longer satisfies the spectral null constraint.

As noted above, neither Okamoto nor Cideciyan show or suggest adjusting an equalization target that satisfies a spectral null constraint so that it no longer satisfies the spectral null constraint. As such, claim 22 and claim 25 are patentable over the cited combination.

With the present amendment, claim 25 has been amended to correct a clear error in the dependency of that claim. When claim 25 was previously amended, its dependency was mistakenly changed to claim 21 when it is clear that it should have been changed to claim 22. Applicants respectfully request entry of this amendment since it will clarify matters for appeal.

Conclusion

In light of the above remarks, claims 1-3, 5, 7-10, 13-22 and 25 are patentable over the cited art. Reconsideration and allowance of the claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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